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Process Action Team Handbook

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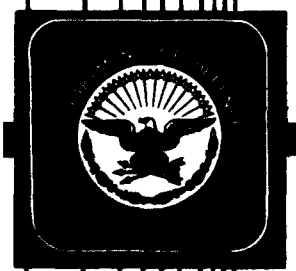

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This Handbook provides detailed information about the need for and formation of Process Action Teams. The resources needed from the organization, including management leadership, training, resource personnel and support, are described. The parts and importance of the Team Charter are presented. Details of the team meeting are given, including agendas of the initial meetings. Most importantly, RAC's Continuous Improvement Strategy is discussed; this provides a step-by-step roadmap for the PAT to follow as it progresses along the improvement process.

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PREFACE

In SOAR-7, *"Guide for Implementing Total Quality Management,"* the Reliability Analysis Center's approach to Total Quality Management was outlined. Employee teams, called Process Action Teams or PATs, have provided one means to link RAC's Continuous Improvement Strategy (CIS) to the culture change required to achieve Participative Management. This state-of-the-art report focuses on providing detailed information about Process Action Teams. Any of the tools presented in this SOAR may be modified by the PAT to suit its purpose.

2.4 CHARACTERISTICS OF HIGH PERFORMANCE TEAMS

CHAPTER 1: MANAGEMENT PERSPECTIVE

1.1 WHY PARTICIPATIVE MANAGEMENT/PROCESS ACTION TEAMS?

First, why should an organization change to Participative Management and establish Process Action Teams (PATs)? The answer is found in one word: money! By improving the quality of processes, thus increasing productivity, less money is wasted on scrap and rework. That money becomes available for investment or profit. The organization becomes more competitive. There is no surer way to permanently improve an organization's financial picture. How does this change take place? Who causes this change? Part of this responsibility rests with Process Action Teams who apply organized effort, such as RAC's Continuous Improvement Strategy, to their processes resulting in the reduction of scrap, rework and waste. The bottom line: the organization saves money.

To achieve the required change means that everyone and every function must adopt a new participative culture. PATs are an integral part of the new culture. This new culture empowers employees by giving them authority and responsibility (as defined by management) for improving their work processes. Empowering employees in PATs taps their thinking and experience by freeing them from the old culture where management made all decisions, especially those dealing with process design and improvement. Management then controlled all process inputs (materials, machines, methods, measurement, environment, and people-related variables such as training) and expected employees to achieve the necessary process outputs. Management now gives employees power and control over their process inputs and outputs and receives, in exchange, from employees a commitment to self-imposed improvement goals. Management establishes high expectations for reducing scrap and rework and supports the PAT's process improvement efforts.

1 Goldratt, Eliyahu M. and Robert E. Fox, *The Race*, North River Press Inc., Croton-on-Hudson, NY, 1986.

Use of this Participative Management philosophy usually leads to higher quality and productivity gains than would be achieved using the traditional authoritarian management style. The new breed of U.S.A. world class competitors have tapped the ideas of their employees for process improvement through various forms of Participative Management and reaped the resulting benefits from their improved competitive position. The Malcolm Baldrige National Quality Award winners are examples of this new breed; they include: Motorola, Westinghouse Electric Corporation Commercial Nuclear Fuel Division, Globe Metallurgical, Xerox Business Products and Systems, Milliken and Company, Cadillac Division of General Motors Corporation, Federal Express Corporation, IBM, Wallace Company of Houston, Solectron Corporation, Zytec Corporation and Marlow Industries.

1.2 THE NEW ROLE OF MANAGEMENT

While many think that Participative Management results in less control, the opposite is actually true. The most effective form of control is the control one places on self to achieve self-set goals. Teams follow this same model of self control by establishing their own improvement goals. The role of management changes from being the source of most ideas to encouraging and supporting employee ideas. Management must become experienced in communication and group dynamics. Communication skills become critical. Real two-way communication, interaction and idea exchange between management and employees is required to make the transition to Participative Management. Management must truly listen to the teams when they bring forth their ideas and support them when they have been given the authority to implement process improvements. These interpersonal skills must be coupled with discovery through scientific experimentation. The participative manager becomes a coach, counselor and teacher. "Participative Management does not

eliminate the manager's role or reduce his accountability for results. Rather, it requires much greater attention to soliciting ideas, encouraging discussions and debate, integrating diverse input, and managing group processes."[1] Care must be taken to keep the teams focused on process improvement. This "permission" to improve processes must be reinforced time and time again. Thus, the challenge in the future for management and employees is two fold:

- Learning to work together (teamwork)
- Using quantitative techniques

PATs will become effective by wanting, learning and working at becoming teams.

1.3 CHARACTERISTICS OF SUCCESSFUL PARTICIPATIVE MANAGERS

Dr. Frohman[2] has identified the seven characteristics of participative managers as listed in italics below. The methodology presented in this document aligns with his characteristics as briefly described below. Further explanation and information are given in subsequent chapters of this document.

1. *"They have a clear understanding of the purpose and direction of the organization."* This is usually expressed in a written mission and vision statement for the organization. This allows everyone in the organization to focus and pursue the same goals and objectives with the same priorities. RAC recommends that PATs operate with a two-part Charter: The Team Mission outlines the boundaries, limitations, authority and responsibility given to the team by management; the Team Code of Conduct outlines how the members are going to treat each other. This Charter allows teams to align their efforts with the rest of the organization. Additional information on the PAT Charter is contained in Chapter 5.

2. *"They have high-performance expectations of themselves and others."* They establish challenging, achievable goals with input from individuals and teams that causes the teams to stretch and grow. This encourages risk-taking. This is discussed in Chapter 6.

3. *"They show the ability to use participative management or other approaches, depending on the situation."* Participative management is not appropriate with all people in all situations. Good managers know their employees and can identify when participative management will be effective. This is described in Chapter 6.

4. *"They show a willingness to be accountable for results."* They hold themselves accountable and want data that is timely, accurate and meaningful so they know how well they are doing. They expect the same data from their teams. Team data collection and analysis are discussed in the Continuous Improvement Strategy, Chapter 13.

5. *"They use two-way communication."* They encourage questions, comments, ideas, and opinions. They want an exchange of information. One of the main benefits of participative management is improved communications. RAC has found that just improving communications can increase the productivity of an organization by 12% to 25%. The linkage among PATs and management is discussed in Chapter 5.

6. *"They use group methods and have interpersonal skills."* They know how to conduct effective and efficient meetings. They know how to manage differences and build interpersonal relations. They know how to be team coaches. This role is discussed in Chapter 9.

7. *"They trust."* The foundation of participative management and Total Quality Management is trust. Without eventually establishing trust between union and management,

employees and management, management and management, and employees and employees, Total Quality Management will fail. To establish trust management must extend and earn it from their employees. Trust will only be returned after it is earned. Once established, trust leads to the open communications, creativity and commitment required for the implementation of Total Quality Management. The participative manager must be able to trust teams to achieve process improvement. Finally, the participative manager must understand that this management philosophy has to permeate the entire organizational culture, rather than be an approach that is seen as a "special project in Department A" or the next "program of the year." The "trust" discussion is contained in Chapter 6.

1.4 ASSESSING THE CURRENT LEVEL OF PARTICIPATIVE MANAGEMENT

If the organization is to change to the philosophy of Participative Management, each manager will have to move toward that ideal. However, the amount of change required for each individual manager will not be the same. Further, the personnel's commitment to change will not be consistent throughout the organization. Some managers will readily grasp the personal benefits which will result from the change while others may see no benefit and be unwilling to change. Also, while the direction of change may be obvious, the means to achieve the change may not be readily available. Seminars and workshops may have to be developed over a period of time to provide management with the skills and tools needed for this new role.

Since change implies a starting point, we recommend that each manager determine his or her current baseline. (The concept of determining the baseline of a process before change is implemented is discussed in Chapter 11). How to measure the manager's level of Participative Management is not simple. Each of the seven characteristics listed in the previous section is not measured by a

simple yes/no scale. Rather, there is a continuum which must be used to assess the current level of attainment on each dimension. For example, the first characteristic refers to a "clear" understanding. What is clear? Clear to whom? Who decides? What is the desired amount?

In the spirit of self-improvement and growth, it may be beneficial for each manager to perform a self-assessment using the tool provided in Table 1. Here each of the seven characteristics can be rated on a seven point scale. Then specific growth opportunities could be identified (such as attending a workshop on communication techniques) which would help the manager become more participative.

Table 1: Participative Management Assessment

PARTICIPATIVE MANAGEMENT CHARACTERISTICS	RATING (1 = LOW, 7 = HIGH)
They have a clear understanding of the purpose and direction of the organization	
They have high-performance expectations of themselves and others	
They show the ability to use participative management or other approaches, depending on the situation	
They show a willingness to be accountable for results	
They use two-way communication	
They use group methods and have interpersonal skills	
They trust	

To gain additional information to help define the areas needing improvement, it would also be interesting for the manager to obtain these ratings from supervisors, peers and subordinates.[3] The results from each of these three groups then would be compared to the manager's self-assessment.

There are at least two ways to look at the results:

- The absolute level on each item can be used to determine the current level of "participativeness" on each dimension. This can be used to suggest areas for improvement. Repeated administrations, perhaps six months apart, would then be used to track change over time.

- The items with large variation among the respondent groups should be examined; the manager would want to assess his or her behavior to determine the reasons for the discrepancy. Is he/she inconsistent in dealing with the three groups? Perhaps that is by design and should not be considered as negative on initial view. What is the manager's personal goals for achieving consensus among the groups? Perhaps a management forum should be used to gain a sense of organizational consensus on "how different" is acceptable.

There are other assessment tools management might use to learn about themselves, their management style, and their organizational culture. Two that have been used by RAC TQM consultants are:

- The Personnel Profile System[4]
- The Organizational Culture Inventory[5]

Each of these tools takes about ten minutes for the individual to complete the inventory and about ten more minutes for self scoring.

The Personnel Profile System is designed to help the user better understand himself and his relations to others. He is given twenty-four sets of four descriptors each, and asked to identify which of the four descriptors in each set is "most" descriptive of him. He then is instructed on how to use this data to derive a personality profile, from which he can identify his strengths and weaknesses, and, if desired, create a self-improvement plan.

The Organizational Culture Inventory asks the user to rate 120 items, from which is derived a profile of the organizational culture considering 12 dimensions: Humanistic-Encouraging, Affiliative, Conventional, Approval, Dependent, Avoidance, Oppositional, Power, Competitive, Perfectionistic, Achievement and Self-Actualizing. These twelve then define three types of cultures:

- ***Constructive Culture*** -- In this culture, employees are encouraged to interact and approach tasks by helping each other meet higher level-order satisfaction needs.

- ***Passive/Defensive Culture*** -- This culture requires employees to interact in ways that will not threaten their own security.

- ***Aggressive/Defensive Culture*** -- In this culture, employees are expected to approach tasks in forceful ways to protect their status and security.

The profile produced can be used in many ways. It can be compared to an ideal profile developed from the same questions. It can become a baseline for measuring progress, by comparing it to profiles generated in the future. Differences between perceptions of management and line workers can be identified by generating separate profiles from each group's responses. In addition, the process used to generate the profile provides a score on questions related to job satisfaction and identifies factors that need attention.

Another tool used to baseline an organization is the award criteria for the Malcolm Baldrige National Quality Award. In addressing the topics required by the award application, an organization can assess its strengths and weaknesses for corrective action, and compare its scores at different times to

to remove barriers and obstacles which hinder the PATs. It also coordinates

assess growth. Government agencies can use the criteria for the OMB Quality Improvement Prototype Award in a similar manner.

Additional traditional management theory sources, such as writings by Drucker[6] and Fiedler,[7] should also be consulted.

this level, for example, might focus on improving the process which develops

1 Frohman, M., "What it Takes to Make it Work", Industry Week, May 2, 1988.

2 Frohman, M., "What They Really Do", Industry Week, August 1, 1988.

3 Note: To be willing to even participate in this assessment might require the manager to have achieved a fairly participative level. Only the manager being assessed need see the results from the three groups unless he is willing to share these with others.

4 The Personal Profile System. Reference: Performax Systems International Inc., 1986; obtain information from Cipriano Training and Development Inc., 211 Schraffts Drive, Waterbury, CT 06705; 203-756-5894.

5 The Organizational Culture Inventory. Reference: Human Synergistics; obtain information from that organization at 39819 Plymouth Road, Plymouth, MI 48170; 313-459-1030.

6 Drucker, Peter F., *Management: Tasks, Responsibilities, Practices,* New York, Harper & Row, 1973.

7 Fiedler, Fred E., Martin M. Chemers and Linda Mahar, *Improving Leadership Effectiveness.*

CHAPTER 2: THE NEED FOR PROCESS ACTION TEAMS

2.1 EMPLOYEES' VIEW

Most people want to be accepted by their fellow employees. They want to belong. Teams provide one means for satisfying this social need.

Employees want the opportunity to contribute their improvement ideas. PATs provide this opportunity. Few employees want to "park" their brains at the door. Empowering employees to improve their processes is considered, by most, a form of recognition that they are capable of generating creative ideas and making decisions. This empowerment increases their self-worth and value to the organization.

Teamwork and process improvement challenges employees and allows them to have the joy of adventure, discovery, and accomplishment that is missing in most jobs. It allows them to contribute what is uniquely them, their individual ideas, talents, experiences, and abilities. This collection of unique individuals is what makes teams and team solutions to process improvement so powerful. This creates an environment where employees want to come to work and contribute.

Teams accomplish more than individuals. Teams are capable of synergy.

2.2 WHY TEAMS?

Teams have several advantages over individual efforts of continuous process improvement. One person rarely has all the knowledge and experience required to understand the entire process. By bringing together all those working in the process, all points of view, skills, talents and knowledge can be used.

The Process Action Team actually goes about the business of process

Perhaps more important is the need for all those working in the process to understand that it takes them all working as a team, with everyone striving for quality, to satisfy their customer. An initial focus on requirements of the internal customer (the next employee) will streamline process operations by removing bottlenecks and constraints, leading to increased throughput, decreased inventory and decreased operating expense. This leads to increased cash flow, increased return on investment and increased net profit.[1] All these "bottom line" results benefit the organization by helping it survive in our competitive marketplace. If internal customers are satisfied, the external customer is sure to benefit since higher quality almost assuredly results.

RAC recommends that organizations start their team efforts with Functional PATs (discussed later in Chapter 4). The ball then starts rolling toward focusing the entire organization on achieving customer satisfaction.

2.3 WHAT IS A TEAM?

Allen Cox[2] has defined a team as a thinking organism:

> The value-added team is a collective state of mind where ideas are food and puzzlements are challenges. It is where conflict is positive because it is out in the open. Responsiveness is paramount. Whether established as a department or ad hoc task force, "team" is a thinking organism where problems are named, assumptions challenged, alternatives generated, consequences assessed, priorities set, admissions made, competitors evaluated, missions validated, goals tested, hopes ventured, fears anticipated, successes expected, vulnerabilities expressed, contributions praised, absurdities tolerated, withdrawals noticed, victories celebrated, and defeats overcome. Finally, it is where decisions are backed when the boss says yes or no to a particular option.

2.4 CHARACTERISTICS OF HIGH PERFORMANCE TEAMS

Teams usually start as a collection of individuals and must work at becoming a high-performance team, i.e., one that truly can accomplish significantly more than its parts (members). Steven Buchholz and Thomas Roth[3] outline eight attributes of a high performance team:

- ***Participative Leadership*** -- creating an interdependency by empowering, freeing up, and serving others
- ***Shared Responsibility*** -- establishing an environment in which all team members feel as responsible as the manager for performance of the work unit
- ***Aligned on Purpose*** -- having a sense of common purpose about why the team exists and the function it serves
- ***High Communication*** -- creating a climate of trust and open, honest communication
- ***Future Focused*** -- seeing change as an opportunity for growth
- ***Task Focused*** -- keeping process action team meetings focused on results
- ***Creative Talents*** -- applying individual talents and creativity
- ***Rapid Response*** -- identifying and acting on opportunities

A PAT grows by concentrating on achieving these attributes. The organization grows toward self-managed high performance teams that do their own scheduling, production goal setting and maintenance. Organizations that have done this find that they need less supervision and support staff (such as

schedulers and industrial engineers). Self-managed teams are usually a long-term goal.

2.5 HIGH PERFORMANCE TEAMS AND PARTICIPATIVE MANAGEMENT

It is interesting to compare the characteristics of successful participative managers (see Section 1.3) with the attributes of a high performance team. Table 2 shows the overlap between these two concepts. Since participative managers are often the leaders of high performance teams, the correspondence is not surprising. Sections 4 and 6 discuss the Team Leader role in more detail.

Table 2: Participative Management and High Performance Team Similarities

PARTICIPATIVE MANAGEMENT CHARACTERISTICS	ATTRIBUTES OF A HIGH PERFORMANCE TEAM
They have a clear understanding of the purpose and direction of the organization	Aligned on purpose
They have high-performance expectations of themselves and others	Future Focused Task Focused
They show the ability to use participative management or other approaches depending on the situation	Creative Talents Rapid Response
They show a willingness to be accountable for results	Shared Responsibility
They use two-way communication	High Communication
They use group methods and have interpersonal skills	
They trust	Participative Leadership

- **FUNCTIONAL PAT:**

1 Goldratt, Eliyahu M. and Robert E. Fox, *The Race*, North River Press Inc., Croton-on-Hudson, NY, 1986.

2 Cox, A., "The Homework Behind Teamwork", Industry Week, January 7, 1991.

3 Buchholz, S. and T. Roth, *Creating The High Performance Team*, John Wiley & Sons, Inc., New York, 1987.

- ***Evaluation Criteria***
  If evaluation criteria are imposed by the Authority-level

becomes a coach, counselor and teacher. "Participative Management does not

CHAPTER 3: TOTAL QUALITY MANAGEMENT PROTOTYPE

3.1 USE OF A PROTOTYPE

RAC recommends that the organization begin TQM implementation by using a prototype rather than trying to change the entire organization at once. Where should the prototype effort be established? That depends on several factors.

First and foremost, management must consider where the organization is not meeting the customer's needs. Since often many areas contribute to this failure, and since the prototype should be successful, prototype selection cannot be based solely on this criteria. This is further discussed in Section 12.

Then, consider who in management has "bought into" the Participative Management philosophy. Who are the TQM Champions? A Champion has personally accepted the responsibility for successful implementation of TQM. The prototype should be located in that part of the organization where participative managers and Champions can lead and support the prototype effort. In some cases, the Champion will be the team leader of one of the prototype teams.

The number of Process Action Teams which will be established under the prototype effort will vary with the organization but will be relatively few (perhaps two to four). The precise number will depend on the resources available to support the teams and the level of management commitment towards organizational change. Top management has the responsibility for planning and supporting the transition to the new culture.

The initial PATs which are chartered (see Section 5) should be improving processes that are relatively simple, recur frequently, and have few input

variables influencing the process output response. The efforts of these initial PATs should be visible to both top management and the external customer. While these initial PATs may be assigned a process to improve by management, they should not be given a management-defined improvement solution. The success of these initial PATs will be used to "convert" some of the non-believers in the organization. Their successes should be highly publicized within the organization.

In summary, the prototype effort should be success oriented, located where all levels of management will support it, and where there is significant potential for improvement. See Table 3 for a checklist of some items to consider when selecting the prototype.

3.2 PROTOTYPE IMPLEMENTATION AND TRAINING PLAN

After management has identified the prototype area, it should develop a plan for introducing the TQM approach both to those who may be part of the prototype areas and/or teams and to those who will support the effort. Milestones along this plan are identified, training needs are determined and resources allocated.

Considerations related to the loss of current output levels must be addressed: training, team meeting and team improvement time necessitates that baseline output (but not quality) will decrease. The up-front recognition and acceptance of this fact by all levels of management is required to decrease the stress level of all involved in the prototype.

ly establishing trust between union and management,

Table 3: Prototype Selection

Prototype selection is critical for the continued success of the improvement effort. Use this checklist to determine appropriate selections based on the number of "Yes" or "True" responses.

ITEMS FOR CONSIDERATION	YES/NO
This project studies one distinct process, with readily identifiable start and end points.	
The process is directly related to an important business element.	
The process directly effects the external customer.	
The process is highly visible within the organization.	
There is consensus among managers that it is important to improve this process.	
There is cooperation among line staff and managers involved in this process.	
The cycle time for this process is relatively short.	
The mission statement for the team describes an opportunity or problem rather than a solution.	
This work area is not scheduled for change in the near future.	

3.3 LESSONS LEARNED FROM THE PROTOTYPE

In addition to illustrating accomplishments, the prototype PATs will be seen as a testing ground of management's commitment to change. All eyes in the organization will be on management to see if their commitment translates into involvement and action. The prototype teams will be important in identifying

organizational barriers to TQM implementation and illustrating management's role and resolve in removing those barriers. During the prototype, additional organizational resources will be discovered that can be used for expanding TQM, e.g., employees that are natural facilitators.

The prototype effort will be used to develop the organization's internal TQM resources, its trainers and facilitators. The prototype will also answer the question, "What changes are required to the Implementation and Training Plan?" Implementing TQM is also a process and as such needs to be continuously evaluated and improved. After completing the prototype, the organization should be able to integrate Total Quality Management (including both the Participative Management and Continuous Process Improvement aspects) with its Strategic Plan. This is one of the keys to achieving TQM institutionalization, a long-term goal.

CHAPTER 4: TQM STRUCTURE IMPLEMENTATION

4.1 AUTHORITY-LEVEL TEAM

Under TQM, management retains its obligations and responsibilities. The TQM Authority-level Team manages and directs the TQM process. It has the responsibility for leading the quality effort and directing the organization's culture change in the desired direction. One major responsibility of the Authority-level Team is to listen to the Process Action Teams it creates and assist them in their implementation of the proved improvements.

Figure 1 illustrates the theoretical TQM team structure within the typical organization.

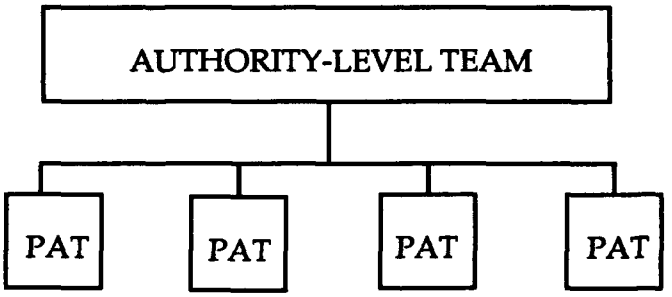

Figure 1: Theoretical Team Organization

Each Authority-level Team provides direction and guidance to each Process Action Team it charters. (Every PAT that is formed must be chartered by a management authority-level team; Charter details are described in Chapter 5).

The Authority-level Team provides resources, including the required training specified in the Implementation and Training Plan, to the PATs; it is available

to remove barriers and obstacles which hinder the PATs. It also coordinates activities among the several PATs, as needed, so that unnecessary duplication of effort is not expended.

Figure 2 illustrate the common actual structure of the teams at the various levels within the typical organization.

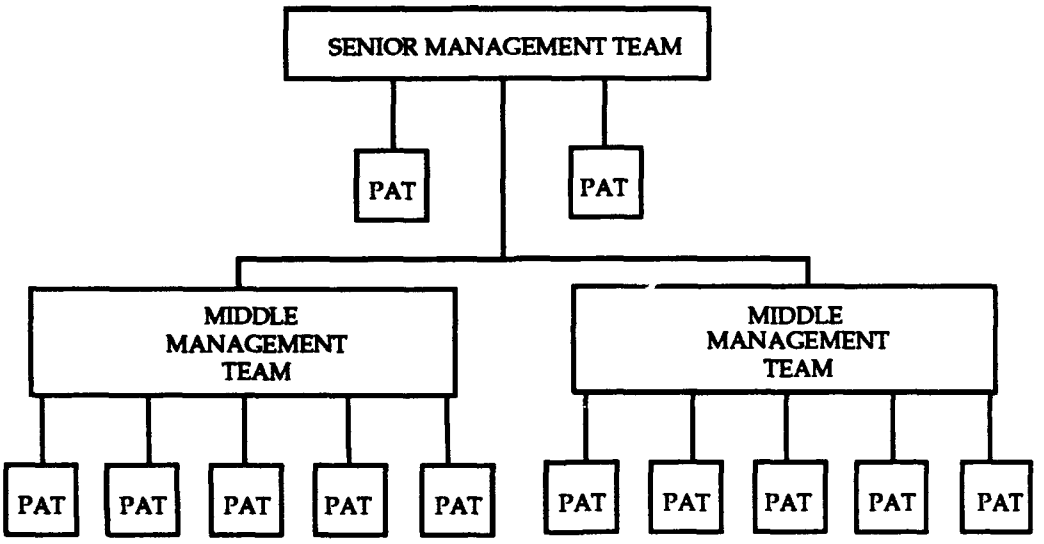

Figure 2: Typical Team Structure

The Senior Management Team, also called the Executive Team or Quality Management Board, includes the organization's highest-level management. This team must authorize and direct the entire TQM effort. Leadership, commitment and involvement at this level are essential to the success of the prototype and to the continuing quality focus. The organizational "TQM Focal Point" and/or the organization's TQM Champion(s) are usually members of this team.

PATs chartered at this level deal with inter-department processes which are typically not part of the prototype effort due to their complexity. A PAT at

this level, for example, might focus on improving the process which develops the organization's annual budget.

Depending upon the scope of the prototype, this Senior Management Team might connect directly with the prototype Process Action Teams. If this is the case, this team must consider how to include the many layers of management which are often found between itself and the prototype level. Many middle managers fear TQM because they perceive a "loss of control" which is often directly traced to the lack of implementing an organization-wide TQM structure.

Especially if the prototype involves several different organizational areas, the Senior Management Team might authorize several Middle Management Authority-level Teams to provide more direct support to the prototype teams. (See Figure 3 for a specific example). The leaders of these Middle Management Teams will be members of the Senior Management Team. For example, a large organization with several departments may have several Department Teams, each of which manages and coordinates all Process Action Teams within the department. The department heads are members of the Senior Management Team.

The Middle Management Authority-level Teams include the management directly involved in the prototype effort as well as any middle management which might be involved in providing support and/or resources to the prototype. The prototype Process Action Team Leaders typically are members of the corresponding Middle Management Authority-level Team. Sometimes the TQM Resource Personnel (described in Chapter 7) also are included or represented on these Middle Management Teams.

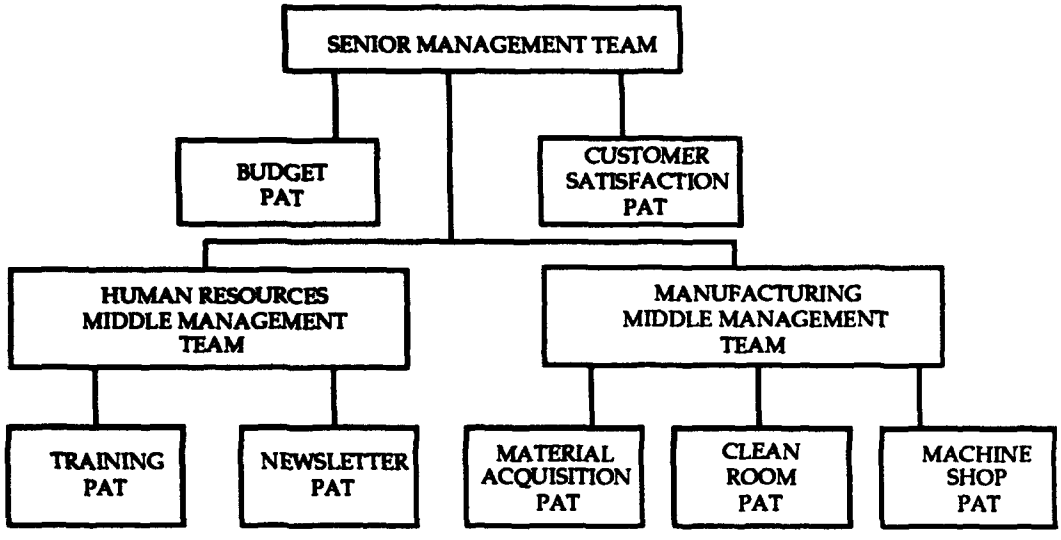

Figure 3: Example of Team Organizational Structure

Status reports from these Team Leaders keep the Authority-level Team aware of PAT developments and progress. Occasionally an entire PAT may be asked to update the Authority-level Team on its progress and/or successes to date. This provides an opportunity for each team member to participate in describing team accomplishments. For many, this provides recognition and intrinsic rewards far superior to "an organizational dinner."

4.2 ACTION-LEVEL TEAMS

The Process Action Team (PAT) focuses on the continuous improvement of processes, that is, the PAT practices TQM. As shown earlier in Figures 1 through 3, a PAT can be chartered by any level in the organization. The ultimate goal of each PAT is to achieve customer satisfaction within the practical realities of team capabilities and authority. Therefore, initial PAT activities focus on customer definition and communication as well as extended discussion on what changes may be required to achieve a higher level of customer satisfaction.

The Process Action Team actually goes about the business of process improvement. Each PAT uses an organized action plan such as RAC's Continuous Improvement Strategy (see Chapter 13) to, first, identify and document the current state of the process and, then, to develop and document (through experimentation), an improved process which is more stable and/or more capable of meeting/exceeding the customer's expectations than the original process. The remainder of this *Process Action Team Handbook* describes PAT training, operation, function, and focus.

4.3 TYPES OF PROCESS ACTION TEAMS

Process Action Teams are of two types: Functional and Cross-Functional.

The first type, the most common in typical organizations, are functional or unit PATs often found at the lowest level in the organization. Each is formed within the organizational structure and exists on a continuing basis for on-going improvement. Functional PATs are given the responsibility and authority for improving their work processes. These PATs are standing teams responsible for the on-going improvement of the processes in their function.

The second type, cross-functional PATs, are formed around higher-level processes that need improvement. Typically, the team is formed because there is a significant opportunity for improvement and/or the process significantly impacts the ultimate customer. These PATs consist of representatives from the several functions working in the process. They are ad-hoc in nature and disband when the process output becomes acceptable to the customer. Cross-functional PATs usually have more difficulty in achieving success than the functional PATs.

The use of Middle Management in this fashion is, by the way, one means of

Some organizations identify problems (rather than processes) for improvement. If there are processes associated with the problem, then the establishment of Process Action Team(s) (usually cross-functional) to focus the improvement effort is advisable. If, however, the problem is not associated with a process but is, perhaps, political or personnel oriented in nature, then the formation of a PAT should not be initiated. A "Tiger Team" or other Focus Team should be formulated but this type of team should not be directly associated with the on-going process improvement effort. Usually the people in the process are powerless to improve these types of problems so that a process-oriented team would not be beneficial.

CHAPTER 5: PROCESS ACTION TEAM CHARTER

The Process Action Team Charter consists of two parts, the Mission Statement and the Code of Conduct. The Mission Statement may be developed by the Process Action Team and approved by the management Authority-level Team, or the Authority-level Team may give the Process Action Team a strawman Mission Statement for their review, discussion, and comment. It is essential that any disagreement about the Mission Statement be resolved before the PAT begins the process improvement effort.

The Process Action Team always is responsible for the development of its own Code of Conduct. This Code defines team operation rules. In no way can it conflict with the organization's corporate Code of Ethics nor can it conflict with legal requirements imposed upon the organization (such as equal-opportunity, non-discrimination or drug-free workplace regulations). The Authority-level Team signs the approved Charter and provides the Process Action Team an official copy.

5.1. MISSION STATEMENT

The Mission Statement defines the team's purpose, boundaries and limitations; it outlines the processes to be improved, the functions to be represented on the PAT and the authority given to the PAT.

- ***Process Definition***
  The Mission Statement may or may not define the process to be improved. This is more common for prototype PATs and is always the case for cross-functional PATs. Functional PATs are usually told to improve the processes they work in and are given the freedom to prioritize their efforts among their many processes. Sample Process Definition statements are shown in Figure 4.

meetings. They help plan the meeting and task assignments and critique minutes. Facilitators are not

- **FUNCTIONAL PAT:**
  To continuously improve the processes within the final assembly area to better serve its customers.

- **CROSS-FUNCTIONAL PAT:**
  The team will review and improve the processes of support equipment acquisition.

Figure 4: Sample Process Definition Statement from Team Mission Documents

- ***Membership and Leadership***
  The Mission Statement contains information on these topics which are further described in Chapter 6.

- ***Authority and Responsibility***
  The Mission Statement specifies the authority and responsibility given to the team by the Authority-level Team. Unlike typical "quality circles," PATs usually are given authority and responsibility to implement (within their specified boundaries) changes to their processes without seeking approval from the Authority-level Team or any other management group. Some decision authority and responsibility must still be retained by the Authority-level Team, but the objective is to drive process decision authority and responsibility as far down the organization as practical and appropriate.

- ***Resources Allotted***
  The Mission Statement also defines the resources controlled by the PAT. This includes the amount of time and money the PAT can invest in training team activities and improvements. Resource personnel (as described in Chapter 7) are also allocated to the PAT.

- *Evaluation Criteria*
  If evaluation criteria are imposed by the Authority-level Team, they are specified in the Mission Statement. (Otherwise, the PAT establishes its own evaluation criteria). This is further discussed in Section 13.8. Any expected reviews or other scheduled events are also outlined in the Mission Statement.

- *Communication Requirements*
  While the Team Leader is asked to keep that team informed of the status and accomplishments of the PAT, there are usually no specific forms developed which are required to track team activity.

- *Mutual Understanding*
  The PAT may ask for clarification so the Mission Statement is clearly understood by all. The Authority-level Team often requests additional information from the Team Leader after receiving the minutes of a PAT meeting.

5.2 CODE OF CONDUCT

The second part of the PAT Charter is the Code of Conduct. After Mission Statement review, the next order of business for a new PAT is to develop its Code of Conduct which states how the team will operate. The PAT's attendance policy, quorum requirements, meeting day, time and place are also included. It specifies what will be considered acceptable and unacceptable behavior during the meetings, including discussion rules. In it, the team defines how it will make decisions. The Code of Conduct is a unique set of statements for each PAT. As long as it is within the organizational Code of Ethics, it does not need approval from management. Its existence is acknowledged when the Charter is approved. A sample Code of Conduct is shown in Figure 5.

processes that are relatively simple, recur frequently, and have few input

- All team discussions are private.
- Team members will attend all meetings so far as possible.
- A majority of members will be a quorum entitled to conduct a meeting and make decisions for the team.
- Professional courtesy will be expected.
- Decisions will be made by consensus.
- Minutes will be sent out the day after the meeting.
- Meetings will be held every other Tuesday at 0900 to 1100.

Figure 5: Sample Code of Conduct

One job of the Team Leader is to assure that the team members live up to their commitment as stated in the Code of Conduct. Initially developing a Code of Conduct helps the PAT on the road to smooth meetings and human relations. Up-front thinking about acceptable behavior sets the tone for all future discussions concerning group dynamics. It may be helpful to devote part of a future meeting to a discussion of how well the PAT is living up to its Code of Conduct. The Code of Conduct and the Mission Statement may require change as the PAT grows.

5.3 TEAM CHARTERS IN THE PROTOTYPE EFFORT

Usually the prototype teams are given very explicit information in the Mission Statement, including the definition of the process to be improved. In addition, the Authority-level Team, as evidence of its leadership role, will develop a Code of Conduct for its own use. This often serves as a model for the prototype effort (a "default" Code of Conduct) which each PAT can "tailor" for its own use, if necessary.

involvement and action. The prototype teams will be important in identifying

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CHAPTER 6: PROCESS ACTION TEAM ESTABLISHMENT

6.1 PAT MEMBERSHIP

The majority of the PAT members should be knowledgeable about the process being studied for improvement. The team will include management (usually the process owner or process supervisor) who serves as the Team Leader as well as workers who perform the process. The team also may include internal/ external suppliers and customers of the process. A sample PAT membership statement (which is included in the Charter) is shown in Figure 6.

- The PAT will consist of six full time members and a leader with, as a minimum, representatives from the Mechanical Lab, Electrical Lab, Engineering, Support and Staff. Additional temporary members may be added as needed for specific studies.

Figure 6: Sample Membership Statement

PAT membership is usually voluntary. Usually there are more volunteers than the eight to twelve spaces available on the PAT. (Note: The willingness to volunteer is an indication of the employees' perception of management commitment). Sometimes the process unit is large (greater than 12), it may be divided into two or more natural work group PATs. Or representatives may be selected to keep the team size manageable. In this case, team membership should rotate perhaps every three to four months to provide everyone the opportunity to participate. For continuity, it may be better to stagger this rotation so that the entire team is not replaced at the same time.

If the PAT work area operates on shifts, representation from each shift should be members of the one team. Meetings should be scheduled on a regular basis (e.g., 08:00 every Friday). They should be "quality" in nature with predistributed agendas and official minutes. The details of team meetings are found in Chapter 9.

6.2 PAT LEADERSHIP

The PAT Leader is usually the process owner, the person in management responsible for the output of the process. When an organization becomes experienced in Total Quality Management, PAT leadership can transition to any team member.

The PAT Leader is responsible for managing team activities, planning and conducting meetings. This includes preparing the agenda and distributing it two to three days before the meeting as well as ensuring that minutes are prepared and distributed within 24 hours after the meeting. The biggest challenge for the Leader is keeping the team focused on process improvement as opposed to problem solving (process improvement prevents problems from recurring). Further, the leader must focus the PAT on a limited number (maximum 4) of process improvement efforts at any one time.

The PAT Leader and the PAT Facilitator (a Resource Person available to help the team; further discussed in Chapter 7) need to discuss and develop the leadership style/approach appropriate to the specific members on the team. As membership changes, both adaptiveness and flexibility are required. The particular situation, as well as the unique blend of individuals, must determine the specific leadership style required. This is no easy task; it requires both knowledge of self and of others to achieve this blend. Experience helps to prepare the Team Leader for this role.

6.3 PAT GOALS

The Process Action Team sets challenging but achievable goals. PAT members are responsible for understanding and agreeing with team goals. Collectively the members support these goals and strive to make them a reality. The team must be willing to take a risk by trying something new or imaginative. Unfortunately, this risk-taking often does not receive peer or management support during the initial demonstration or experimental development. One purpose of the prototype is to provide this support and encouragement.

6.4 AUTHORITY AND RESPONSIBILITY

Everyone must understand that PAT membership and resulting assignments are now part of the job, not an addition to it. PAT members must attend team meetings and give team assignments appropriate priority. They contribute their unique skills, experience, creativity, ideas and thoughts. They constructively criticizing ideas, not the originator of ideas. They freely give credit and recognition to other PAT members and are responsible for keeping a positive attitude. They understand their own personality and work style as well as those of the other PAT members.

The PAT usually has the full authority to develop and implement new or improved processes/procedures/policies. Sufficient time must be given to allow the PAT to accomplish process analysis and improvement. The members understand that team solutions are final, and must be fully supported by all members.

Each PAT is responsible to its Authority-level Team. The Leader is authorized to request assistance, data, material and personnel support. Such requests shall have the same priority as if issued by the Authority-level Team. The PAT

Leader, usually a member of the chartering team, is responsible for keeping the Authority-level Team and others in management informed of the process improvement status.

6.5 TRUST

While it may sound simplistic, TRUST is the basis of team success. Many trust relationships are required. Trust among team members (including the Teams Leader) is required so that they might grow together into the High Performance Team (discussed earlier in Chapter 2). More obvious is the trust required between levels within the workforce - - senior management to middle management to first-line supervisor to (and throughout) all levels of employees. Trust, however, is not mandated - - it is earned. Trust is reflected in the organizational culture. Often a baseline measurement of the existing culture surprises management, especially on the trust dimension. Building trust takes time and usually starts out slowly. But all employees must make the effort to forget the past and allow management as well as the workforce the opportunity to change. The prototype effort, hopefully, will demonstrate some trust development among the authority-level and action-level teams. If not, the probability of successful TQM implementation is very low.

CHAPTER 7: PROCESS ACTION TEAM RESOURCE PERSONNEL

Resource personnel may fill one or more of three internal TQM resource roles: Trainer, Facilitator, and Quantitative Expert.

7.1 SELECTION CRITERIA

Candidates are selected on the basis of their education, experience and interpersonal skills, leadership style, credibility in the organization and willingness to serve. Often they have previous experience in providing training and/or in providing facilitation in other organizational activities. The current "Training" Department and/or "Human Resources" Departments may have individuals who have received specific education for these roles.

In addition to requiring knowledge of the organization, TQM, and of the psychology of adults (in terms of behavior, inter-action techniques and learning methods), the selected individuals must have demonstrated specific traits. Some of these traits are listed in Table 4.

Identifying individuals to serve as Trainers and Facilitators is not overly difficult in most organizations. However, the Quantitative Experts may not exist in the organization and/or may not have the out-going personality traits required to be successful. Often the Resource Personnel role is filled by members of middle management who possibly have been displaced from their management positions due to the leveling of the organization (one common result of improving the organization's processes).

Table 4: Resource Personnel and Team Leaders: Character Traits

Participative Leader	Leader; Leads by example
Self-confident	Secure enough to let others learn to lead; Able to share power
Deal effectively with people	Consistent; Sense of Humor; Calm; Outgoing personality Not overpowering personality; Positive, Approachable, Pleasant; Creates/keeps non-threatening atmosphere Sensitive to others' personalities and needs; Nurturer: A role model
Communicator	Active and effective listener
Trustworthy	Willing to keep others confidences; Respected
Risk-taker	Adaptable; Persistent
Motivated	Self-Starter; Enthusiastic; Ability to achieve results
Visionary	Advocate; Willing to adopt the new philosophy
Utilize available resources	Taps needed available resources; Effective; Efficient; Timely
Ability to explain statistics	Someone who is comfortable with numerical analysis. A background in statistics is preferred, but a willingness to learn quantitative methods is acceptable.

The use of Middle Management in this fashion is, by the way, one means of including them in the prototype effort; this elicits their buy-in and support. However, being a member of management is not a prerequisite for being selected as a member of the Resource Personnel Team in most organizations.

In seeking volunteers for this role, management should not overlook individuals who have demonstrated leadership roles outside the workplace. These include Scout and 4H leaders, youth sports coaches and referees, and community and church organization officials. Consider, too, those individuals whom everyone seeks for advice when a "person" type problem occurs.

7.2 PREPARING RESOURCE PERSONNEL FOR THEIR ROLES

Typically, management identifies candidates for this role. These selectees, either collectively or individually, must be informed of the responsibilities that are associated with the Resource role. Then each should be able to decline the opportunity without any retribution. Some may consent to assume the role and then, following training and initial exposure, may decide that they are not comfortable. Again, no retribution should result. Being a member of the Resource Personnel Team is not easy. It demands extensive energy and is, at times, very draining.

To adequately prepare the individuals for their new role requires both classroom training and practical experience. The former usually involves a minimum of 40 hours in an intensive workshop atmosphere which focuses on the basics of TQM, the Continuous Improvement Strategy, team development and management, and the quantitative tools. The latter will depend on the individual -- and will be a function of both prior background and experience as well as specific character traits.

The Resource Personnel develop and demonstrate their proficiency during the prototype process improvement effort. It is usually wise to use skilled consultants, such as the RAC professionals, to develop the prototype teams. As they train the teams, they will serve as a role model for the resource personnel, teaching by example.

Continuing education and training is essential for the "continuous improvement" of these personnel. They, themselves, form an essential team in the organization and must meet together on a regular basis to discuss and improve the implementation process. They also should be encouraged (through released time and the provision of tuition/travel expenses) to attend both formal and informal courses and workshops which will enhance their skills.

7.3 RESOURCE PERSONNEL RESPONSIBILITIES

These three roles have a variety of responsibilities during the TQM implementation process.

- ***Trainers*** - The organization's TQM Trainers are responsible for providing the training to the PATs. The specifics are described in Chapter 8. They customize examples and tailor the instructional materials to the participants.

- ***Facilitators*** - Many organizations initially provide a Facilitator as a consultant to the PAT. Facilitators are recommended for those organizations just beginning to implement Total Quality Management. The PAT's Facilitator forms a partnership with the PAT Leader and together they guide the team's group dynamics. The facilitator may also train the team in the use of the basic process improvement tools.

  As team consultants, they are resource for information about the organization, group dynamics and the simple statistical tools. They observe and evaluate team

meetings. They help plan the meeting and task assignments and critique minutes. Facilitators are not responsible for leading the team or the team meeting. They are not there to solve the team's problems. Their goal is to help the team become self-sufficient and thus work themselves out of a job.

- *Quantitative Experts* - These Resource Personnel assist the team with the selection and use of advanced quantitative tools and techniques. They usually have advanced training in the concepts, techniques and tools used in the Continuous Improvement Strategy.

7.4 TIME AND OTHER ORGANIZATION REQUIREMENTS

There are several practical considerations which the organization must address relative to these Resource Personnel. RAC has seen various combinations be successful and can not specifically state that any one method is superior to the others. Individual and organizational culture and characteristics vary widely.

The first consideration is whether the Resource Personnel role is full-time or part-time. In some organizations, the role is full-time and the Personnel are released from the previous work assignment. One obvious advantage of this approach is that the people are not torn between two jobs, neither of which is considered "full-time" but often each having supervisors with "full-time" expectations. The opposing view suggests that a person can not stay current in the knowledge of the organization's processes without being directly and currently involved in the day-to-day operations.

Time requirements during the prototype effort may certainly approach full-time. It may take as much as fifteen to twenty hours per week to facilitate a prototype team; this includes attending the team's training, coaching the

between-session assignments (see Section 8), identifying available resources, intervening with (middle) management and prototype support function personnel who have not been involved in the prototype training but are needed to support the prototype team(s), and working with the Team Leader to help in the transition to participative management. After the Facilitator becomes more proficient, learns the informal networks which exist in any organization, and gains confidence, the time requirement per team will drop to a maximum of ten hours per week. As the team develops into a high performance team (as discussed earlier in Section 2), the facilitator will not be needed on a regular basis by the team. That is the goal -- for the facilitator to work himself out of a job. The team should still be able to call on the facilitator as needed.

The Trainer's time requirements are much different than those of the Facilitators. Teaching requires both preparation and practice. It can easily be a full-time job during the prototype and during the full-scale implementation. Some organizations develop trainer teams so that the time requirements are not so severe and/or to prevent trainer burn-out. Some trainers will always be needed to provide training for new employees as well as to develop refresher workshops and continuing education in advanced topics.

The Quantitative Experts initially will have the smallest time requirements. Usually not until the experimentation stages are reached will their expertise be needed. However, as more and more teams are created, the need for help with the quantitative aspects of TQM increases. There are many quantitative techniques which are not even mentioned in the beginning team training that will need to be addressed for at least some of the teams. Knowledge in computer utilization and other associated technical specialties will be required.
Another consideration (especially in large organizations) is whether the person should help (only) teams within their own sub-organizations (i.e., division or department) or whether they should serve (only) other

departments. Certainly working within one's own department increases process (and political) knowledge. But the Facilitator is not there to define the PAT's methods of process improvement. However, the Trainer role needs customized examples that would be easier to develop if the Trainer is knowledgeable about the process. On the other side of the coin, often it may be beneficial to be impartial when dealing with teams and processes in a different department. Certainly it would be "unfair" if the Facilitator were required to coach a team which contained his or her supervisor either as the Team Leader or as one of the members.

CHAPTER 8: PROCESS ACTION TEAM TRAINING

Once the PAT Leader and members have been determined, the process of training them to operate as a PAT begins. From the earlier discussion of a high performance team, it should be obvious that just putting a group of people together and calling them a team, does not make them a team. In reality they will have to work at becoming a team. Thus, the training RAC recommends for PATs begins by accepting this challenge.

RAC recommends that training be given over a period of several months to allow the PAT the time required to grow together and apply what they are learning to their unique processes. This just-in-time, hands-on approach increases the effectiveness of the training. An outline of the recommended initial forty hours of training is found in Figure 7. The ten sessions may be given in increments of five full days or ten half-days separated in time. If possible, Sessions 4 through 10 should be spaced to allow the team enough time to apply the tools and techniques being taught to their specific processes before advancing to the next session. For example, enough time should be allowed between Sessions 4 and 5 for the completion of the PAT's flow chart of their unique processes. This allows immediate feedback on their ability to apply the tools and techniques taught in each session. This real time application of the tools and techniques to the PAT's actual processes increases retention and answers the very important question, "How do we apply this to our specific processes?"

Note that the training as outlined includes several team meetings. In essence, the PAT starts functioning as a team during the training. Exercises are built into the training to help the PAT grow as a team. Anything the organization has available which will enhance the growth of the team should be added to the course. As an example, the organization may have a short course in "Effective Listening Techniques" that could be given to the PAT.

This training is the minimum required for starting a PAT, there is no maximum. In fact, training is an ongoing activity in the life of a PAT. This training is designed to accomplish two objectives: helping the group grow into a high performance team while learning and applying the Continuous Improvement Strategy to the PAT's specific processes.

SESSION 1	SESSION 2
OVERVIEW OF TQM	IMPLEMENTATION OF TQM
SESSION 3	**SESSION 4**
INTRODUCTION TO THE CONTINUOUS IMPROVEMENT STRATEGY STAGE 1: SELECT THE TEAM AND PROCESS Team Roles Generating Ideas and Making Decisions Conduct Team Meeting 1 • Review Mission • Develop Code of Conduct • Discuss products/services delivered The Communication Process	STAGE 1 (cont'd) Process Identification and/or Selection Flow Chart Pareto Chart Conduct Team Meeting 2 • Discuss current operations • Examine existing data • Select process for improvement • Action Item: Begin Flow Chart Understanding Self
SESSION 5	**SESSION 6**
STAGE 2: DESCRIBE THE PROCESS Customer/supplier requirement/capabilities Using operational definitions for indicators Measurement Issues Conduct Team Meeting 3 • Identify critical elements • Discuss operational definitions, measurement & data collection • Action Item: Visit customer/supplier	STAGE 2 (cont'd) Data Collection Displaying Data: Run Charts & Histograms Conduct Team Meeting 4 • Review/discuss flow charts • Review customer/supplier meetings. Refine definitions, measurement and data collection plans • Action Item: Start gathering data
SESSION 7	**SESSION 8**
STAGE 2 (cont'd) Modeling Data: Normal Distribution Analyzing Data: Summary Statistics Conduct Team Meeting 5 • Review process data. Refine definitions, measurement and data collection plans • Action Item: Is normal model ok? • Action Item: Calculate summary statistics	STAGE 2 (cont'd) Exploring Relationships: Cause & Effect Diagrams, Scatter Plots, Correlation & Prediction Document Everything Conduct Team Meeting 6 • Consider relationships • Develop cause and effect diagrams • Action Item: Quantify relationships
SESSION 9	**SESSION 10**
STAGE 3: ASSESS THE PROCESS Stability Control Charts: An Overview Process Capability Indices Conduct Team Meeting 7 • Review and analyze process data • Review Cause and Effect Diagrams • Discuss procedures required to evaluate stability and capability • Action Item: Evaluate stability and capability	STAGES 4 - 8: IMPROVE THE PROCESS Experimental Process Conduct Team Meeting 8 • Review and analyze process data • Brainstorm process improvement ideas • Classify/prioritize ideas • Develop Theories for Improvement • Action Item: Plan First Experiment CONCLUDING THOUGHTS

Figure 7: Team Workshop Outline

CHAPTER 9: PROCESS ACTION TEAM MEETING

This chapter provides general information about the Process Action Team meeting. Chapter 10 gives specific information about the first three team meetings.

9.1 QUALITY FOCUS

Since the organization is changing to a quality culture, everything the PAT does, including the team meetings, should be "quality." Behavior at a quality meeting conforms to the PAT's Code of Conduct. Figure 8 is a checklist of those things that need to be considered before, during and after the meeting.

The PAT Leader, supported by the Facilitator, assures the quality of meetings. The Leader manages the team activities, with input from the members. The Leader keeps the PAT focused on process improvement. As noted earlier, a quality meeting begins with a quality agenda distributed at least two days before the meeting; it ends with a quality set of minutes that are prepared and distributed within 24 hours of the meeting.

9.2 MEETING AGENDA

One of the things a team should do before closing a meeting is to decide what it will do at its next meeting. From the team decision, the leader prepares the agenda. A team agenda is usually less rigid than a committee agenda, as the team, rather than the leader, sets the priorities. Initially, however, the leader must provide the focus. Beginning teams will also benefit by "ice breakers" which help the members to be comfortable with each other. A typical agenda is shown in Figure 9. Estimated times for each of the items is useful for planning purposes, but the team has the right to modify the agenda

by consensus. If they feel a discussion is productive, they may elect to continue it despite the agenda.

BEFORE THE MEETING (TEAM LEADER)

- Define what you want to accomplish
- Make sure you are ready
  - Clear goal
  - Reduce number of issues/tasks
  - Establish clear agenda
- Check arrangements

AT THE MEETING (EVERYONE)

- Understand purpose
- Separate facts from feelings/opinions
- Divide big issues into smaller ones
- Separate issues from people
- Periodically summarize
- Show courtesy and respect
- Listen attentively
- Involve everyone
- Encourage and support
- Summarize accomplishments

AFTER THE MEETING (EVERYONE)

- Assess progress toward original goal
- Assess your impact on the meeting
- Assess group dynamics
- Share results/accomplishments
- Follow-up assignments
- Plan next meeting

Figure 8: Meeting Checklist

DATE: _____

Agenda: Team Meeting # _____

TEAM: _____

1. Ice breaker (3 minutes)
2. Take attendance (1 minute)
3. Quick review of last weeks' minutes (2 minutes)
4. Information exchange (5 minutes)
5. Status/Progress Reports: Review assigned Action Items: (20 minutes)
   1. _____
   2. _____
   3. _____
6. Team Activities: (15 minutes) _____
   1. _____
   2. _____
   3. _____
7. Review/Assign Action Items: (5 minutes) _____

   _____
8. Quality Education (5 minutes)
9. Meeting Evaluation (3 minutes)
10. Next Meeting: (1 minute)

    Date and Time: _____

    Place: _____

Figure 9: Typical Meeting Agenda

The Leader must keep the PAT focused on the process, identified for improvement. The agenda is the tool used for this purpose. During the meeting the leader will keep the discussion focused on process improvement and help the team live up to their Code of Conduct. If the team strays from the agenda and/or Code of Conduct the Leader must call it to their attention. The PAT should be reminded that the agenda and Code of Conduct is the result of their agreement and that they are obligated to either abide by them or change them.

Keeping the team focused means keeping the number of action items to a manageable number. Four action items being worked at one time by a PAT is usually enough. No more than two action items should be assigned at one time to an individual PAT member. Action items that are assigned should be specific, action oriented and measurable (target dates) They should be broken into tasks that can be accomplished in one to two weeks to allow the PAT members a sense of accomplishment. Action items should challenge, but be realistic. When assigning an action item, the PAT Leader should discuss it with the responsible member at the meeting to assure understanding. Obviously, action items should be included in the minutes.

9.3 NOT THE PAT FOCUS: PAINS AND PERIPHERALS

Initially, the PAT may want to tackle quality of life improvements (pains) and issues beyond the authority of the organization (peripherals). Pains may include a broken water cooler, a break area which is too far away, peeling paint in a work area, lack of parking space or any other issue which fosters employee dissatisfaction and low morale. (Safety issues are not pains and must be resolved immediately). Pains identified by the PATs should be viewed by management as an opportunity to demonstrate to the PATs that they will be supported; thus management must take action on at least some of the pains. The resolution may require imaginative solutions which may not have been within

the traditional management's view. For example, the broken water cooler may require a part which will take several weeks to acquire. Management could provide bottled water (usually perceived as a management perk). Or management might furnish the paint or remodeling materials if the workers will provide the labor. Parking lot lines can be redrawn to accommodate more, but smaller, vehicles. A team of management and employees can be formed to develop alternatives for these pains.

Peripherals often include employee evaluation methods, regulations and requirements, and other "rules" which are handed down from a higher level of the organization. While evaluation methods may be difficult to change, elements in the evaluation can be changed at the local level. Additions could include participative management, leadership and high performance team characteristics. Communication skills, consensus decision making techniques and other elements could be emphasized. Technical orders, for example, are perceived as "unchangeable" or so tied up in red tape that many years would be required to enact a change. But a PAT could collect the required information to demonstrate that the change would be beneficial. Then the management would be required to forward that information through the proper channels and to the proper levels to provide the visibility and influence needed for the technical order to be changed in a timely manner. RAC consultants have seen process improvements, especially method changes in light of new or modern equipment, reflected in government technical order changes that have occurred in six months or less. Peripherals should be elevated to the appropriate level in the organization for resolution; the PAT should not spend any more time with those issues unless specifically directed by management.

9.4 TEAM DISCUSSION

The team discussion process is everyone's responsibility. Team discussion should concentrate on process improvement. An open flow of ideas should be encouraged. Ideas are solicited from everyone and all given a fair hearing. Everyone should be encouraged to participate. No one is to be penalized for giving their opinion. Discussion should center on the merit of the idea, not the person presenting it. Personal accusations should not be allowed. All criticism should be directed at ideas, not at the person with the idea.

9.5 CONTINUED LEARNING

Every meeting should contain an opportunity for learning more about quality. The responsibility for this Agenda Item 5 may be voluntary or one that rotates among the members. Some suggestions for this portion of the meeting are

- Present information on any subject relative to quality
- Present information by a subject matter expert on a specific topic
- Provide instruction on a new quantitative technique
- Review the quantitative technique the team is about to use
- View video tapes on quality
- Review short articles relevant to quality

9.6 MEETING MINUTES

The minutes are not meant to be a complete record of the discussion that took place. They need to cover attendance, summarize discussion issues, document decisions, list action items, present accomplishments and any other significant

business. Minutes should be limited to no more than two typed pages, with one page preferable. They usually are distributed within one day of the meeting.

While PAT Leaders are responsible for team minutes, that does not mean that they actually have to prepare them. Usually the Team Leader asks for a volunteer to be the Team Recorder at the first PAT meeting. If no one is willing to volunteer, some teams rotate the responsibility among the members on a monthly, or quarterly basis, giving everyone an equal chance to perform the duty. If all else fails, the Leader may have to appoint someone to assume this responsibility.

9.7 MEETING EVALUATION

Every meeting should end with a review of the meeting process. The PAT needs to ask itself if it was satisfied with all aspects of the meeting, including the behavior of its members (and guests) at the meeting, the progress made at the meeting, and the focus on process improvement. This review may be more formal in the beginning of the PAT's existence to emphasize the components required for an effective, efficient meeting. A checklist that can be used or modified by the PAT for this purpose is found in Figure 10. The PAT may want to devote a future meeting, especially in its early stages, to reviewing how well members are interacting and operating as a team. The facilitator should be observing the PAT at each meeting and provide feedback on team mechanics and operations to the Leader and/or the entire team.

This checklist may also be used for a future PAT "Clinic." A PAT Clinic is a meeting devoted entirely to discussing how well the team is functioning both technically and behaviorally. Sometimes one meeting every three or four months is devoted to such a discussion of team operation and interpersonal relationships.

As the team progresses, a less detailed team evaluation tool can be used. The high performance team might periodically ask, "Is there something we can do to improve the effectiveness of our meetings?"

	ACTIVITY	YES	NO
1.	Meeting was held as scheduled or reschedule notice was issued.		
2.	There was a written agenda followed for meeting.		
3.	Assignments with target data were made during meeting.		
4.	Tasks were shared equally by all members.		
5.	Participation by all was balanced and equal.		
6.	Project reports were made.		
7.	Project milestone charts were updated.		
8.	Leader demonstrated a participative style by involving all members in appropriate discussion and decision making.		
9.	Leader demonstrated patience.		
10.	Meeting started on time.		
11.	Meeting ended on or before time.		
12.	Resource people were present as scheduled.		
13.	Attitude of responsibility for team success was shown by all.		
14.	Conflicts or misunderstandings were successfully resolved.		
15.	There was an energetic & positive attack on the project.		
16.	Road blocks to progress were removed when encountered.		
17.	Appropriate problem solving techniques were used (includes training in new techniques when needed).		
18.	Minutes of last meeting were read at beginning of meeting.		
19.	Agenda for next meeting was prepared at end of meeting.		
20.	Meeting space was available & set-up before meeting time.		
21.	Equipment & supplies were available for productive meeting.		
22.	Attendance records were posted.		
23.	Visual aids were effectively used.		
24.	Creativity enhancements were utilized (warm-ups).		
25.	The meeting had a specific purpose.		
26.	The meeting ended with members evaluating the meeting.		
27.	The meeting was productive.		
28.	Did the leader maintain or enhance the members' self esteem?		
29.	Leader kept the focus on problems rather than personalities.		
30.	Did the team move forward (make progress)?		

Figure 10: Meeting Evaluation Checklist

CHAPTER 10: THE FIRST THREE PROCESS ACTION TEAM MEETINGS

This chapter outlines the actions a team will take in the first three team meetings. It is meant to be a detailed guide for Team Leaders, Team Members and Facilitators.

10.1 PAT MEETING ONE

At this first meeting, the various participants feel a variety of emotions: anxious, elated, reserved, doubtful, and so on. The challenge for the PAT Leader is to establish an environment that provides the security and support required for true teamwork. The PAT Leader must also assure that everyone on the team understands that the primary order of business for the PAT is process improvement.

Figure 11 is a suggested agenda for that first meeting. This agenda should be prepared by the Leader and sent to all members at least two days before the first meeting. This sets the quality tone for all future agendas and meetings.

The first meeting should start with an "ice breaker," some way of opening up the team to participation and creative thinking. The ice breaker should be designed to require each member to participate in some manner. It is also a good way to learn more about each other. An ice breaker may be required in future meetings, depending on how willing the members are to participate and contribute during the meeting.

Discussing the results of the Personal Profile System (see Chapter 1), or similar aids to understanding individual differences, is a good ice breaker as it provides some insight into group dynamics and a mutual experience for the team

members. Making the Code of Conduct, refining the Charter, and such activities as defining responsibility (see Figure 13), are also ice breakers as they tend to unify the team. Strictly social activities (e.g., introduce yourself and state one thing about you the group does not know) have their place as short ways of encouraging participation.

If the team members do not know each other, introductions which explain each member's background and experience, as well as how these relate to the process being studied, help the team get started. Figure 12 is a form that the team may want to use to track membership and training.

One of the first orders of business for the PAT is the establishment of responsibilities including the selection of a recorder of the minutes. A form that the PAT may want to use for listing responsibilities is the Responsibility Matrix shown in Figure 13.

The next order of business is the review of the team's Mission Statement as provided in the PAT's Charter by the Authority-level Team. Any clarification or recommended change should be provided to the chartering team to assure mutual understanding and acceptance.

A draft of the second element of the Charter, the Code of Conduct, is developed by the team during this first meeting. PATs may want to brainstorm elements of an effective meeting to help them with this task.

The PAT next needs to determine its products and services (relative to its specific improvement mission). What are the outputs of the PAT's processes? Establishing this list is an opportunity for the members to share their view of the process with the other team members. After all possible products and services have been identified, the PAT must determine which are significant in

terms of importance to the customers and resource utilization. Finally, the PAT must determine what processes are used to provide the product and services. They must also determine what, if anything, they need from the authority level team to do the assigned mission. Figure 14 is a worksheet that can be used for this purpose.

The need for continuous quality education must also be established at the first PAT meeting. The PAT must determine how this responsibility will be shared by the members. Most PATs rotate the assignment so that each meeting a different member presents the quality education. The emphasis is on continually learning about quality. In particular, "Just-in-Time" training in the use of tools the team needs to accomplish their mission must be provided, by one of the appropriate resource personnel.

Any action items resulting from this first meeting should be assigned and discussed during the meeting. Action items may include: continuing review of the Charter (Mission Statement and Code of Conduct), review of products and services, and next week's quality education.

The PAT needs to decide where and when meetings will be held. PATs usually meet in the same place and at the same time for one hour each week.

Finally, the first meeting is concluded with an evaluation of the meeting. Did the PAT follow its Code of Conduct? Was progress made? Were any problems encountered that should be avoided at the next meeting? The PAT may ask, "Did we make progress at this meeting?" or "Are we satisfied with the progress made at this meeting?"

AGENDA: MEETING 1

MEETING DATE _____ TEAM _____

1. Ice breaker (10 minutes)
2. Introduction of team members (10 minutes)
3. Select recorder of minutes (minutes are to be issued one day after the meeting). (2 minutes)
4. Information Exchange (2 minutes)
5. Review Team Mission (10 minutes)
6. Determine Team Code of Conduct: Roles, Teamwork, Attendance expected, Discussion Rules (10 minutes)
   a. Brainstorm elements of the Code of Conduct
   b. Develop Code of Conduct
7. Discuss products/services delivered by the team (8 minutes)
8. Quality Education/Discussion (2 minutes)
9. Review and assign action items: (5 minutes)
   a. Obtain regular meeting place and time
0. Next meeting: Time: _____
   Place: _____
   Location: _____
1. Meeting Evaluation (1 minute)

Figure 11: Agenda: Meeting 1

TEAM MEMBERSHIP RECORD

ORGANIZATION: _____

LEADER: _____

SPONSOR: _____

FIRST MEETING DATE: _____

MEMBERS	TRAINING (DATES)
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	

ASSOCIATED PEOPLE	TRAINING (DATES)
1.	
2.	
3.	
4.	
5.	
6.	
7.	

Figure 12: Team Membership Record

TASK	WHO IS RESPONSIBLE?			
	LEADER	MEMBERS	MANAGE-MENT	FACILI-TATOR
MEETING • Agenda • Minutes • Evaluation				
TRAINING • Quality • Continuous Improvement Strategy • Quantitative Tools				
PROJECTS • Reports • Plans • Assignments				
TEAM DYNAMICS • Communica-tion • Participation				

Figure 13: Responsibility Matrix

DISCUSSION:
TEAM'S PRODUCTS AND/OR SERVICES

What are our products and services?

How do we provide them (i.e., what is our process)?

Figure 14: Meeting One's Discussion: Team's Products and/or Services

10.2 PAT MEETING TWO

A proposed agenda for the second meeting is shown in Figure 15. A word of caution at this point. Some teams become so involved in trying to follow Robert's Rules of Order that they forget the real purpose of their existence, continuous improvement of their processes. RAC recommends that the Team Leader use common sense in the conduct of team meetings rather than adherence to Robert's Rules. Use the Code of Conduct, instead, to define meeting operation and the decision process. The ideal is that PAT decisions are made by consensus rather than by a majority vote. Cooperation, rather than competition, is to be the operational mode of the team.

An ice breaker probably will be required for the second and several future meetings. The ice breaker will no longer be necessary when all team members willingly and actively participate in team discussions.

After the attendance is taken, the pre-distributed minutes of the last meeting should be quickly reviewed. Action taken on assigned action items should be presented and reviewed. Questions should be resolved and further actions required agreed to and assigned. Any information of interest to the general membership should be provided to the team.

The PAT then moves to the real reason for their existence, process improvement. (Note: A process is always assigned to a cross-functional PAT, but may not be assigned to a unit or functional PAT. If a process has not been assigned to the PAT to improve, one is selected by the team. See additional discussion in Chapter 12). This begins by developing the "as is" flow chart for the process. This may be an action item for a subteam within the PAT. The flow chart, as the name implies, displays the sequence of process operations; it describes the way the process is actually being done, not how it is supposed to be done, or how ideally it should be done. Initially, the "high-level" chart is developed; as

further investigation continues, more detailed charts of relevant sub-parts of the process are made. The results allow the PAT to divide a complicated process into pieces that can more easily be analyzed.

AGENDA: MEETING 2

MEETING DATE _____ TEAM _____

1. Ice breaker (10 minutes)
2. Attendance (2 minutes)
3. Quick review of previous meeting's minutes (2 minutes)
4. Information Exchange (2 minutes)
5. Review Assigned Action Items (2 minutes)
   a. Obtain regular meeting place and time
6. Consider/Select the initial process for improvement (30 minutes)
   - Discuss the current state of operation
   - Examine any existing data (and make into Pareto charts, if possible) which describe the current state of operation.
   - Discuss the process flow or order of operations
   - Begin process flow charts
7. Review and assign action items: Finish process flow chart (5 minutes)
8. Quality Education (5 minutes)
9. Meeting Evaluation (2 minutes)
10. Next meeting: Time: _____

    Place: _____

Figure 15: Agenda: Meeting 2

Any other unresolved issues should be assigned as action items by the PAT Leader. As with every meeting, time should be taken for quality education. This will be on the agenda for every PAT meeting. The second meeting, as the

first and all following meeting, ends with an evaluation. The concerns at the second meeting are "Was it a better meeting then the first?" and "Has the PAT moved toward identifying the flow of the selected process?"

10.3 PAT MEETING THREE

This discussion of PAT Meeting Three assumes that the PAT has selected a process to improve and has started to flow chart that process. A typical agenda for this meeting is found in Figure 16.

As before, the meeting starts with an ice breaker and proceeds to a review of last meeting's minutes and on to an exchange of information of general interest to the whole PAT. Assigned action items are reviewed, including the review of the flow chart to determine the internal customers and suppliers of the process. The internal customer is the person or organization receiving the output of the process. Internal suppliers are those persons or organizations providing inputs to the process (material, methods, machines, training, etc.). External customers and suppliers are also considered if this process has direct contact with them.

Next, the PAT is required to find out what the customer expects of that product or service. What quality characteristics are of importance to the customer? What quality data are being tracked by the customer or are required by the customer? Figure 17 outlines an exercise that a PAT can use to help it with the analysis of customer expectations. Its object is to assure that the team and the customer have the same perception of expectations. RAC recommends that the PAT visit the customer's work area to find out exactly how its product or service is used by the customer.

AGENDA: MEETING 3

MEETING DATE _____ TEAM _____

1. Ice breaker (5 minutes)
2. Attendance (1 minutes)
3. Review of previous meeting's minutes : (2 minutes)
4. Information Exchange : (4 minutes)
5. Review Assigned Action Items: (10 minutes)
   a. Review Process Flow Charts
6. Discussion: Identify the critical elements that determine your work area's success/survival. (25 minutes)
   a. For each of these critical elements, discuss operational definitions, measurement issues and data collection strategies.
   b. Action Item: Visit internal customers/suppliers and discuss the above with them. Modify your team's answers based upon their input.
7. Review and assign action items: (5 minutes)
   a. Assign members to meet with the customer(s) to determine customer requirements and measures of quality.
   b. Assign members to meet with supplier(s) to determine their capability and explain your measures of their capability.
8. Quality Education : (5 minutes)
9. Meeting Evaluation : (3 minutes)
10. Next meeting: Time: _____
    Place: _____

Figure 16: Agenda: Meeting 3

- Discuss your internal customer(s)
  - What is your perception of your customer's expectations?
  - What really are your customer's expectations? (ASK THEM!)
  - How do you know that your customers are satisfied?

Figure 17: Team Exercise: Internal Customer Expectations

One of the challenges of any team is to properly measure the output of their process. (See an expanded discussion in Chapter 11). RAC's advice is to ask the customer what is important to them and then establish a data collection system that provides that information to both the PAT and the customer. In a similar fashion, the PAT has the responsibility of letting their suppliers' know the PAT's expectations. An understanding of their suppliers' capabilities is in order, however. The PAT can not expect a supplier to provide products or services that are beyond their current capability, without being given the time and resources for improving their processes.

The above requirements may result in several action items at this third and subsequent team meetings. The challenge to the PAT Leader at this time is to keep the number of action items to that which can be reviewed in a one hour meeting and to design each action item so that it may be completed within one to two weeks. The PAT and individual members should not be allowed to get bogged down in this improvement effort; they must be able to see and feel a sense of accomplishment. As with all meetings, the third meeting ends with some time devoted to quality education and meeting evaluation.

10.4 PAT MEETING FOUR AND BEYOND

This *Process Action Team Handbook* is limited to describing the first three PAT meetings because it is impossible to generalize progress after this point (and in some cases, to this point) in a PAT's life. Each PAT will proceed on the path of process improvement at a rate that depends on the knowledge and growth of the PAT Leader and members as well as the ease of improving the process chosen for improvement. The team should follow an organized action plan such as described in Chapter 13.

10.5 TEAM TOOLS

The power of diversity in the team can be harnessed by appropriate team tools. Some of the best known of these are:

- Brainstorming. This is probably the most used team tool. When ideas are needed (e.g., How shall we conduct a customer survey?), the leader writes the topic on a chart and calls for ideas under the following rules:

  1. The more ideas, the better
  2. No evaluation will be made of any idea during the session
  3. Every idea will be written down

  He may then proceed with an unstructured session where anyone with an idea calls it out for the record, or with a structured approach where each team member is asked in turn for an idea. The member may pass. After all members are solicited, the leader returns to the first person for another round, until everyone passes. The structured method is used to insure all members get a chance to participate. The result of brainstorming is a list of ideas to consider.

- The Nominal Group Technique. This is one way or reducing the list of ideas to those the group considers most important. After similar ideas are combined, each is identified by a letter. Each member of the team then ranks the ideas in order of importance. An efficient way is to identify the most important and the least important, then the next most and least important, etc., until the ideas are listed by letter in order of importance. They are then numbered in order from

the least important to the most. After each member is done, each idea is given a score by adding the numbers assigned to it by the team members. The ideas with the highest score is the team's choice for most important.

- Futuring. This is a planning tool. Each member of the team relaxes and imagines what they would notice if they were completely successful in their mission. The team then discusses these ideas and arrives at a composite vision, which they then compare to current reality. Where there is a difference, the barriers to achieving the vision are identified and an action plan created to eliminate the barriers.

These and other tools are designed to take full advantage of the different viewpoints of the team members. Their judicious use will enhance the changes of team success. In addition, most teams enjoy the activities, which helps keep them interested in the improvement effort.

CHAPTER 11: PROCESS ACTION TEAM FOCUS

11.1 PROCESS DEFINED AND INPUTS AND OUTPUTS ILLUSTRATED

The Process Action Team's focus is on process improvement. But what is a process? A process is a set of sequential steps that adds value to the process inputs, resulting in the process output(s) which are required by the customer. The process inputs include the materials, methods and/or procedures, machines and/or equipment, people, environment and measurements involved. The outputs are the quality characteristics which are desired by the customer.

In a welding process, for example, the inputs include the raw materials being used in the welding process (such as the brand and type of weld rod) as well as the materials being welded (steel: type, age, hardness, cleanliness), the welding method (such as electric arc), the welding equipment (the rod holder, for example), the trainer, experienced person who is performing the weld, the lighting and ambient temperature of the work environment, and the measurement methodology such as X-ray employed. The output characteristics might include specified levels of tensile strength, hardness, elongation, and offset yield.

In a paperwork process, such as travel request form processing, the inputs would include the input information supplied by the potential traveler, the method of contacting air travel companies (telephone, fax or direct computer link), the equipment used (computer and associated software, typewriters), the form processing personnel (training, experience, aptitude, attitude), the working conditions (lighting, noise level) and the measurements used. The output characteristics would include both timeliness and accuracy.

Figure 11: Agenda: Meeting 1

11.2 PROCESS OUTPUTS: QUALITY CHARACTERISTICS

Customers are usually interested in quality characteristics which can be placed in these categories:[1] performance features, reliability, durability, consistency, service-ability, aesthetics, and perceived quality. When working with the customer to define their expectations in these categories, care must be taken to develop **operational definitions** (i.e., measurable statements) for each of the quality characteristics of interest.

It is essential to ask the customer which is (are) the most important? If there is more than one customer for the process, is there a difference in expectations? If there is, it may be useful to bring the customers together to discuss the different expectations and, if possible, to get agreement on the priority of the output expectations as well as the acceptable levels of each characteristic.

11.3 PROCESS BASELINE ESTABLISHMENT

Each team is responsible for obtaining initial (**baseline**) measures of the "health" of its process outputs. A baseline for each data element of interest must be established to determine if the customer is currently satisfied, and, if not, how much improvement will be required to satisfy the customer. These provide a reference point against which the team can evaluate the results of its improvement effort. These also can be used to decide when the current process improvement effort is finished.

11.4 DATA COLLECTION SYSTEM

If the data of interest to the customer are not currently available, and a system must be developed to collect the data, design the data collection system for

simplicity and ease of understanding. The data collection sheet used should be tested with the actual members responsible for collecting the data.

Specific tools to record these definitions are provided in Chapter 14.

11.5 PROCESS SUPPLIERS

The PAT is also obligated to provide its suppliers with a prioritized listing of its quality characteristics and operational definitions. This information then can be used as a scorecard to evaluate how well the suppliers are doing. Without this feedback, a supplier can not be expected to improve.

If data are not currently available for these characteristics, together the PAT and its suppliers can develop a data collection system to provide the required data. As with the output characteristics, a baseline must be established for input characteristics of importance to the PAT.

In the long-run, the organization must establish partnerships with its external suppliers. Reducing/eliminating supplier variation by reducing the number of suppliers must be an organizational goal.

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1 Thomas W. Nolan, "Improvement of Quality as a Business Strategy", Paper presented at the Third Annual International Deming Users' Group Conference, Cincinnati, OH, August 21-22, 1989.

CHAPTER 12: WHERE TO BEGIN: PROCESS SELECTION

The most critical question is **not how** to go about the improvement effort (that is the discussion in Chapter 13 and throughout the rest of this *Handbook).* The critical question is **where to begin.** Which processes should be selected for improvement first? Which processes are the most critical and which can wait? How do we know?

12.1 OPERATIONS ANALYSIS

It is essential to begin by using a structured, systematic approach to assess the current operation of the entire organization, including support and administrative areas. This Operations Analysis reviews everything about the operation, from organizational structure to vendor/supplier control and capability. Specifically, this investigation includes all major systems to determine the current state of efficiency and effectiveness of each. The assessment usually includes (but is not limited to) the areas and systems listed in Table 5. The goal is an integrated, comprehensive study of current operations which is then used to determine present capabilities. The results yield many opportunities for improvement across all areas of the organization.

Data currently available are analyzed, including information in the Management Information System and the Quality Information System, to assist in the establishment of baselines for the organization. Typical data examined include: customer (internal and external) complaints, quality data including defect information, processing information such as process bottlenecks and process yields, and cost of quality data, including scrap and rework history. Process inputs and resultant outputs are analyzed to determine which processes have stability and are capable of meeting both internal and external customer requirements.

Table 5. Operations Analysis Focus

Organization Health/Culture	Organization Structure and Responsibilities Quality Culture: Vision, Philosophy, Goals Attitudes, Work Ethic
Operations Systems	Process Identification and Flow Material Flow Measurements Systems Standard Operating Procedure Evaluation Scheduling/Planning Process/Machine Capabilities
Technology Utilization	Degree of Automation Computer Availability Computer Utilization
Support Systems	Information Systems Quality Systems Corrective Action Systems Internal Quality Systems Financial Audit Systems Configuration Management Customer Support Systems Vendor Support Systems Inventory Systems Storage and Warehouse Systems Facilities and Equipment Maintenance Systems Worker Skills Assessment New Employee Orientation System Training Systems Inspection Systems Word Processing /Clerical Support Systems
Administrative Systems	Personnel Marketing Contracts Accounting Purchasing

Also, the organization's culture is assessed using, for example, the Organizational Culture Inventory discussed in Chapter 1.

As another part of this assessment, key individuals at various levels are interviewed, often by an impartial, outside consultant who is experienced in performing this technique. Both management and worker-level employees are contacted to obtain ideas about what needs to be improved. Thus the employees' experience and opinions are coupled with pertinent data as part of the overall look at the operations. To successfully accomplish this assessment requires the cooperation of all organization employees; management, especially, will be required to furnish both verbal information as well as historical data related to operations and finances.

The purpose of this assessment is to determine which processes need to be improved and in what priority. The direction is fact-finding (which processes need to be improved), not problem solving (how should they be improved). Improvement will be the responsibility of the Process Action Team.

The resultant Operations Analysis report documents the results and identifies the organization's strengths and weaknesses. Included in the feedback to management is the summary of present capabilities, results of analyses, flow diagrams and any other information gained in the assessment. This report may also contain prioritized recommendations for future action as well as their predicted impact on the organization's productivity and quality.

12.2 POSITION SURVEY

A second methodology for determining which processes are the best candidates for the improvement effort involves looking **outside** the organization at other organizations -- both in the same market and from different markets, world-

wide. A Position Survey identifies organizations with similar processes and determines the "best" process indicators, called **benchmarks**. For example, delivery processes can be compared to leaders such as Federal Express, warehouse processes can be compared to L. L. Bean, etc.

The benchmark information gained about process improvements from leading world-wide organizations is very valuable in process improvement efforts. For example, it helps the organization's management develop realistic goals. It provides data on customer satisfaction -- how to measure as well as current levels. The application of the knowledge gained from the benchmarking study provides a foundation for building operational plans to meet and surpass current world-wide best practices. It can provide a competitive advantage which can lead to enhanced profitability. [1]

12.3 PROCESS SELECTION

Thus the answer to "where to begin" is for management to decide where there exists the greatest opportunity for improvement (and survival) based on the results of both the Operations Analysis and the Position Survey. Using both these methods, management now has the information necessary to make more informed decisions about the processes, including which ones to select first for improvement. Certainly, the processes selected should be important to the customer (internal or external), impact the mission of the organization and offer significant savings potential.

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1 Robert C. Camp, *Benchmarking: The Search for Industry Best Practices That Lead to Superior Performance*, ASQC Quality Press, 1989.

CHAPTER 13: CONTINUOUS IMPROVEMENT STRATEGY

The Reliability Analysis Center has developed and demonstrated successful implementation of Total Quality Management with its Continuous Improvement Strategy, a roadmap which provides the focus and direction often lacking in other approaches. The Strategy is outlined in Figure 18. This section provides is a brief overview of each of the eight stages contained in this strategy. Chapter 14 provides some helpful forms for use with this Strategy.

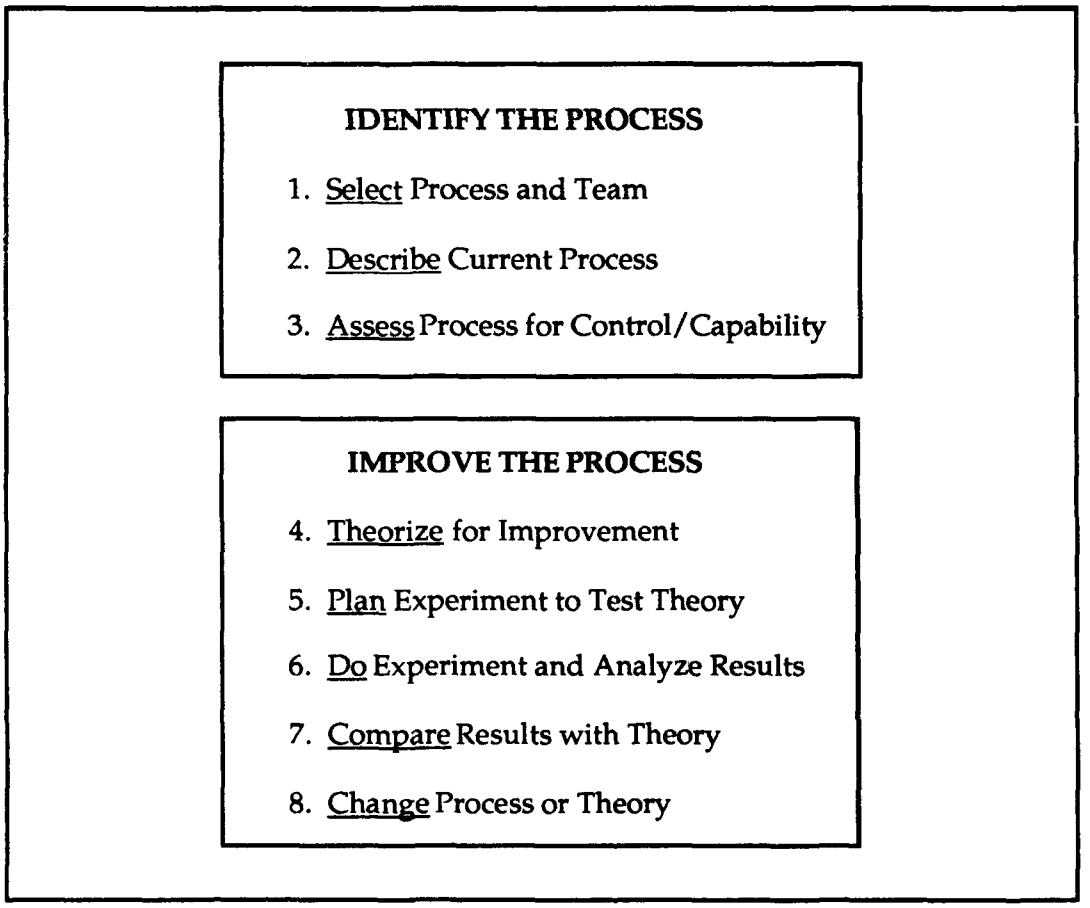

Figure 18: RAC's Continuous Improvement Strategy

This Strategy is a synthesis of the philosophies of the various quality experts as well as the many lessons learned from extensive practical experience. It is founded in common sense. Those familiar with the work of Dr. W. Edwards Deming will quickly see the Shewhart Cycle (Plan - Do - Check - Act) in Stages 5 through 8.

The basic team skills and quantitative techniques that are used in the improvement process are not new either. The "profound knowledge," as described by Dr. Deming, has been available since the 1920's and can be learned by almost everyone in a relatively short time-span (i.e., a few days). They comprise at least 90% of the activities and analyses required by the Process Action Teams.

Often organizations obtain expert consultant advice (both on the management aspects of Total Quality Management as well as in the team and quantitative aspects of the Strategy) before and during implementation. An experienced, unbiased, impartial third party may be used to provide the initial Operations Analysis as well as provide regularly-spaced follow-up assessments to determine the organization's progress along the continuous improvement path. The implementation of Total Quality Management is both simple and complex. The methodology of obtaining universal support within the organization for an individual's innovative idea is very difficult to institutionalize. "People" problems far out weigh "quantitative" difficulties. There are many consultants available, with varying levels of expertise and differing orientations and philosophies. RAC professionals can provide both training and consultant services in all aspects of Total Quality Management; this supports its charter as a Department of Defense Information Analysis Center.

13.1 STAGE 1: SELECT PROCESS AND TEAM

As discussed in Chapter 12, identification of the processes for improvement is critical for success and survival. The TQM prototype effort begins, however, with relatively simple improvement efforts to demonstrate that the TQM approach will work in the current organization; these include: allowing the organization to change its culture, allowing management to demonstrate leadership, and allowing the Resource Personnel to be trained in their roles. The process to be improved should be visible to management and the customer, be relatively simple, offer a high probability of success and posses few input variables that are affecting the output of the process. Refer back to earlier sections for discussions of these topics.

During this First Stage, management determines which process(es) is (are) to be improved and which team(s) will be responsible for the improvement. When these first processes have been identified, the PAT is formed. As discussed earlier, teams are chartered by management and membership is selected from the volunteers who wish to participate in the prototype effort. Refer back to earlier sections for discussions of these topics. Each Process Action Team should pursue one process at a time for improvement.

After the prototype has been completed and the organization has embraced TQM as the philosophy which may allow it to survive in this competitive world, the more complex, and more important processes can be attacked. The opportunities for improvement are vast if the organization can break free of its traditional mindset and allow innovation to flourish.

13.2 STAGE 2: DESCRIBE THE PROCESS

In this stage the PAT's objective is to learn everything they can about the process. The usual starting point is an "as is" flow chart of the process. This flow chart should describe exactly how the process is actually done, not how it is supposed to be done, or how the PAT would like to see the process done. The completed process flow chart is then reviewed with an eye for improvement. Where does scrap and rework occur? Where are data collected? What new data collection points are needed? Where are tasks being done differently by different PAT members, or by different shifts? What inconsistencies are due to environmental factors? What are other sources of variation?

The process's suppliers and customers, both internal and external, should be identified and contacted. The PAT needs a complete understanding of their customers' requirements and must fully explain their requirements to their suppliers. Worksheets for capturing this information are found in Chapter 14.

From the flow chart and the information received from customers and suppliers, the PAT can determine what process baseline measurements will be required. Operational definitions for each measure will be discussed with the customer/ suppliers and a mutually acceptable definition established to assure a common understanding of each measure. Both input and output measures (indicators) must be established and baseline values determined. A further objective is to establish the cause and effect relationships that exist between input variation and output variation.

13.3 STAGE 3: ASSESS THE PROCESS

Both process inputs and process outputs will be assessed for stability and control. Stable processes are in a state of statistical control; that is, the process characteristics (its distributional shape, mean and variation) are constant over time. Capable processes meet customer requirements; that is, they are within specifications. Control charts and capability indices are used for this purpose. Measurement systems are addressed first to assure that they are providing repeatable, reproducible and stable measures. The Process Improvement Worksheet provided in Chapter 14 is very useful.

13.4 STAGE 4: THEORIZE FOR IMPROVEMENT

The quality measures are analyzed to determine if the process is statistically stable and capable of satisfying the customer's expectations. If the process is not stable, the reasons why must be identified and removed. Stages 4 through 8 are used for this purpose. If the process is stable, then the comparison must be made between the actual process centering and variation relative to the customer's specification of the target and allowable variation. (Usually the process initially is both off-target and has too much variation). The improvement effort, again using Stages 4 through 8, then focuses on identifying innovative changes in the process which will yield the desired shift in process bringing the center of the actual distribution closer to the target and/or the reduction in process variation towards that allowable by the customer.

This improvement effort begins with the PAT developing a theory for improving the process. It considers all the information from Stages 1 through 3 while in this "thinking" stage. The team brainstorms, consults subject matter experts and/or synthesizes ideas. The objective is to identify all significant sources of variation which affect customer's desired outputs and determine how

to eliminate or reduce each source of variation. One technique that the team might use is to visualize the perfect process and try to move toward it. The team also needs to consider the use of the latest technology in developing its theory for improvement.

This theory is then tested by conducting an experiment on the process (Stages 5 through 8). If the experiment demonstrates that the process has improved, the team implements the innovation and then monitors the process to assure it obtains and maintains the improved state. This improvement cycle continues with the team exploring another innovative theory.

The objective is to learn more about the process. Some theories may not be correct, but learning still takes place. Teams (and management) must know and accept the fact that some theories/experiments may end in failure, i.e., the process isn't improved. However, the team has gained new knowledge about the process that will be used to develop a new theory for improvement.

13.5 STAGE 5: PLAN AN EXPERIMENT TO TEST THE THEORY

Most PATs want to skip Stages 5 through 7. PATs (like the rest of us) are conditioned to instant results and do not want to take the time to prove that its theory will, in fact, improve the process. The team often is inclined to implement the improvement assuming, not proving, that it will, indeed, improve the process.

A Process Improvement Plan is developed that outlines what is to be done, when it will be done (milestones), who will do it (team members), how it will be done (where, equipment, method, etc.), what data are to be collected (quantities and times), how the data will be collected (forms) and analyzed.

The Plan should become an attachment to the team minutes and progress tracked at each meeting. Sufficient detail must be included in the Plan so that something is being accomplished every week or two. This allows the team to gain confidence through incremental achievement. Try to give everyone on the team a piece of the action. Trail run data gathering sheets before putting them in use to make sure that they are understood. Don't be afraid to change the Plan because of some new information; it should be a living document.

13.6 STAGE 6: DO THE EXPERIMENT AND ANALYZE THE RESULTS

The Process Improvement Plan developed in Stage 5 is executed in Stage 6. The process change is made and data collected for analysis of the effect of the change. The same statistical tools used to analyze the process before the experiment are used to analyze the effect of the change. Process stability and capability will usually be analyzed using control charts and capability indices. The results are an attachment to the team minutes.

13.7 STAGE 7: COMPARE THE RESULTS WITH THE THEORY

The data gathered after the change are compared to the data gathered before the change. If the process was unstable, is it now stable? If the process was not meeting customer requirement (not capable), is it now meeting those requirements? Can a cause and effect relationship be established between the change made in the process and the improvement observed? Do the statistical results agree with the engineering, scientific or process knowledge? All results are documented and become part of the team's minutes.

In this stage, the question, "Will the proposed improvement in fact improve the process?" is answered. This stage provides the evidence that the process has, in fact, improved. This Stage cannot be skipped. However, many teams

succumb to this temptation. If the process is now acceptable, the savings that results from the improvement should be calculated and reported to management so recognition comes to the team for a job well done.

What trade-offs should be considered? Perhaps purchasing, installing and training everyone on an expensive computer system will save a few minutes per transaction. Is the savings worth the cost? Often the trade-offs must be evaluated by the organization's management who have a global view of the broad corporate issues.

If the theory was not supported, what was learned can be used to enhance the theory or develop a new theory.

13.8 STAGE 8: CHANGE THE PROCESS OR THEORY

If the results were as expected and are reasonable to implement, then the PAT permanently implements the change. Controls are established that assure that the process will continue to operate at this new improved level. Communication is stressed to assure that everyone understands the need for and expected results of the change. Any training that is required must be developed and given to those requiring it. New procedures may be required. Standard operating procedures are rewritten. RAC has found that the majority of process changes are procedure changes that cost relatively little compared to capital expenditures for new equipment or machines.

Fool proof the new procedure to eliminate any opportunity for error. Allow time for the learning curve to take effect before determining the benefits of the improvement. Publicize successful improvement efforts. All these implementation details should become part of the revised Process Improvement Plan. The team should be given the responsibility for making the changes to the Plan.

If the data does not support the new theory for improvement, the PAT must develop another theory. The PAT returns to Stage 4 to consider, develop and conduct a new experiment. Innovation is not easy and discouragement can easily set in. Management encouragement is essential at this critical stage. The Authority-level Team may decide to add or exchange team members. Sometimes this is appropriate (especially if the team lacks some vital expertise) but other times the original members just need to focus on innovative, imaginative ideas.

It is essential that each Process Action Team **evaluate** the success of its efforts relative to three simple questions:

- Did throughout increase? (or, equivalently, did scrap and rework decrease?)
- Did costs decrease?
- Did inventory decrease?

If the team decides that the answer to each of these is "NO" then no net improvement has been accomplished. These three are essential to, but do not guarantee, organizational survival. They result in increased cash flow, increased return on investment and increased net profit.

When does the PAT stop trying to improve the process being studied? In theory, never! But with limited resources, an organization is interested in the maximum return on its TQM investment. Thus, the question for the Authority-level Team becomes, "Is there another process in more need of improvement?". That is, is another process less stable and less capable then the process being studied? If so, the PAT (or another PAT) needs to study that more deserving process.

CHAPTER 14: MORE PROCESS ACTION TEAM TOOLS

Two tools that mav be helpful to the PAT are the Process Improvement Plan and the Process Improvement Worksheet. The Process Improvement Plan supports the Continuous Improvement Strategy and identifies who has been assigned what responsibility and with what target dates as shown in Figure 19. This plan can be used as a record of the PAT's improvement efforts.

MILESTONES	ASSIGNED TO	DATE DUE		COMMENTS
		TARGET	ACTUAL	
Visit customers and suppliers				
Determine requirements/ capabilities				
Define operational definitions				
Complete "as is" Flow Chart				
Determine Cause and Effect Relationships				
Establish Baseline Indicators				
Negotiate with customers/suppliers				
Etc. (as appropriate)				

Figure 19: Process Improvement Plan

The Process Improvement Worksheet contains key information needed about the process being improved. Process inputs are captured. Process methods are identified. Process outputs are outlined. In all cases, the form allows the recording of the standard or specification (both target and specification limits) if it has been defined and the actual process results (both mean and standard deviation). The worksheet summarizes all the pertinent information in one place. A sample Process Improvement Worksheet is shown in Figure 20.

Process Being Improved _____

PROCESS INPUTS	SUPPLIER	KEY INDICATOR	STANDARD	ACTUAL
Materials				
Machines				
Information				
Training				

PROCESS METHODS	WHO DEFINES	REQUIRE-MENTS	STANDARD	ACTUAL
Procedure				
Measurement				
Control				

Figure 20: Process Improvement Worksheet

IN-PROCESS MEASURES	WHO DEFINES	KEY INDICATOR	STANDARD	ACTUAL
Quality				
Cost				
Schedule				

PROCESS OUTPUTS	CUSTOMER	KEY INDICATOR	STANDARD	ACTUAL
Product				
Quality				
Cost				
Schedule				
Service				
Quality				
Cost				
Schedule				

Figure 20: Process Improvement Worksheet (cont'd)

APPENDIX A:

RAC PRODUCTS

RAC Product Order Form

		U.S	Non-U.S.
CRTA-CE	Introduction to Concurrent Engineering	75.00	85.00
CRTA-GaAs	An Assessment of GaAs Device Quality and Reliability	50.00	60.00
CRTA-PEM	Plastic Microcircuit Packages: A Technology Review	50.00	60.00
CRTA-QML	Qualified Manufacturer's List: Device Manufacturing Procurement Technique	50.00	60.00
CRTA-TEST	Testability Design and Assessment Tools	50.00	60.00
DSR-4	Discrete Semiconductor Device Reliability	100.00	120.00
FMD-91	Failure Mode/Mechanism Distributions 1991	100.00	120.00
FTA	Fault Tree Analysis Application Guide	80.00	90.00
MDR-21	Microcircuit Device Reliability Trend Analysis Databook	100.00	120.00
MDR-22	Microcircuit Screening Analysis	125.00	145.00
MFAT-1	Microelectronics Failure Analysis Techniques - A Procedural Guide	140.00	180.00
MFAT-2	GaAs Microcircuit Characterization & Failure Analysis Techniques	100.00	120.00
MFAT-1&2	Combined set of MFAT-1 and MFAT-2	200.00	260.00
NONOP-1	Nonoperating Reliability Databook	150.00	170.00
NPRD-91	Nonelectronic Parts Reliability Data 1991	150.00	170.00
NPRD-91P	Nonelectronic Parts Reliability Data 1991 (IBM PC database)	400.00	440.00
NPS-1	Analysis Techniques for Mechanical Reliability	60.00	70.00
PRIM-92	A Primer for DoD Reliability, Maintainability ,Safety and Logistics Stds	120.00	140.00
RAC-NRPS	Nonoperating Reliability Prediction System (Includes NONOP-1)	1400.00	1450.00
RDSC-1	Reliability Sourcebook	25.00	35.00
RMST-91	Reliability and Maintainability Software Tools 1991	50.00	60.00
RQ	RAC Quarterly (Subscription for four issues/one year)	30.00	35.00
SOAR-2	Practical Statistical Analysis for the Reliability Engineer	40.00	50.00
SOAR-4	Confidence Bounds for System Reliability	50.00	60.00
SOAR-5	Surface Mount Technology: A Reliability Review	60.00	70.00
SOAR-6	ESD Control in the Manufacturing Environment	60.00	70.00
SOAR-7	A Guide for Implementing Total Quality Management	75.00	85.00
SOAR-8	Process Action Team (PAT) Handbook	80.00	90.00
TOOLKIT	RADC Reliability Engineer's Toolkit	10.00	20.00
VPRED	VHSIC Reliability Prediction Software	150.00	170.00
VZAP-91	Electrostatic Discharge Susceptibility Data 1991	150.00	170.00
VZAP-91P	Electrostatic Discharge Susceptibility Data 1991 (IBM PC database)	400.00	440.00
ZRN	RAC Newsletter (Distributed free of charge each quarter)	0.00	0.00
ZSG	RAC Services Guide (Description of RAC consulting services)	0.00	0.00
		Priority Handling - see below	
		Quantity Discount - see below	
PLEASE MAKE CHECKS PAYABLE TO IITRI/RAC		***Order Total***	

COMPLETE FORM ON BACK OF THIS PAGE WHEN ORDERING

Name _____

Company _____

Division _____

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Country _____

Phone _____ Ext _____

Ordering: Fax to (315) 337-9932 or mail to **Reliability Analysis Center, P.O. Box 4700, Rome, NY, 13440-8200**. Prepayment is preferred. Credit cards (VISA, AMEX, MSTR) are accepted for purchases of $25 and up. All Non-U.S. orders must be accompanied by a check drawn on a US bank.

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